VLASOV, V.G.; CHUFAROV, G.I.

Reduction of uranium trioxide with carbon monoxide. Zhur. prikl. khim. 34 no.1:20-27 Ja '61. (MIRA 14:1)
(Uranium oxide) (Carbon monoxide)

AVERBUKH, B.D.; CHUFAROV, G.I.

Reduction of zinc sulfide with graphite in a mixture of iron oxides. Zhur. prikl. khim. 34 no.1:27-31 Ja '61. (MIRA 14:1)

1. Institut metallurgii Ural'skogo filiala AN SSSR.
(Zinc sulfide) (Graphite)

23812
S/020/61/138/001/016/023
B103/B208

24,7500 (1144, 1160, 1136)

AUTHORS: Balakirev, V. F. and Chufarov, G. I., Corresponding Member AS USSR

TITLE: Equilibrium conditions in systems Co-O and Co-O-H

PERIODICAL: Doklady Akademii nauk SSSR, v. 138, no. 1, 1961, 112-114

TEXT: The authors determined the crystal lattice parameters of the two cobalt oxides accurately defined: CoO and Co_3O_4. CoO has the lattice type of NaCl, Co_3O_4, the spinel type. The authors studied samples of Co_2O_3 (from the zavod "Krasnyy Khimik", plant "Krasnyy Khimik") and also detected a spinel type of the lattice with parameters similar to those of Co_3O_4. It was, however, difficult to determine the quantity of the parameter, since the lines in the roentgenogram are indistinct. The authors point out that anhydrous Co_2O_3 cannot be prepared, but that CoO and Co_3O_4 may form solid solutions with oxygen. Since the published data on the

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Equilibrium conditions in systems...

dissociation pressures of cobalt oxides in the system Co-O-H and on the equilibrium in this system are contradictory, these problems have been studied. They are important for the production of cobalt and its compounds (for the technology of direct production of high-quality cobalt metal from its oxides by reduction with hydrogen). The authors obtained Co_3O_4 by annealing analytical-grade "cobalt oxide" for 70 hr at 800°C in the air. Table 1 contains data on the equilibrium pressure of oxygen in the system $Co_3O_4 \rightleftarrows 3CoO + 1/2\ O_2$:

T, °K	923	973	1073	1123	1173
P_{O_2}, mm	$5.32 \cdot 10^{-2}$	0.12	7.3	25.0	153.5

The equilibria in this system and in the system $CoO + H_2 \rightleftarrows Co + H_2O$ were studied both in the direction of the Co_3O_4 dissociation and of the CoO oxidation; the oxygen pressure was determined in a vacuum device. The mean values of the O_2 pressure for the dissociation of Co_3O_4 are expressed by

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Equilibrium conditions in systems...

the following equation: $\log P_{O_2} = -\frac{16522}{T} + 13.4$ (P_{O_2} in atm); the change of the isobaric-isothermal potential $\Delta Z^o_T = 37794 - 30.652\ T$ cal. The dissociation pressure of Co_3O_4 being high, the equilibrium $Co_3O_4 + H_2 \rightleftarrows 3CoO + H_2O$ is difficult to determine directly owing to the low equilibrium pressure of H_2. But the authors determined from the equilibrium conditions of the two processes coupled in this system: $Co_3O_4 \rightleftarrows 3CoO + 1/2\ O_2$ and of the dissociation of water vapor: $H_2O \rightleftarrows H_2 + 1/2\ O_2$, for the latter of which $\log K_{H_2O}$ equals $-\frac{13160}{T} + 3.05$, the terms of temperature dependence of the equilibrium constant: $\log K' = \log P_{H_2O}/P_{H_2} = \frac{4899}{T} + 3.65$ and of the change of the isobaric-isothermal potential: $\Delta Z^o_T = -22413 - 16.699\ T$ cal. The equilibrium constant decreases with increasing temperature owing to the exothermic

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Equilibrium conditions in systems...

character of the reaction $\Delta H^{o}_{298.1} = -19412$ cal. It was found that in previous studies of the equilibrium $CoO + H_2 \rightleftarrows Co + H_2O$ methods with considerable errors had been applied. Among others, neither thermal diffusion has been considered, nor the equilibrium gas mixture analyzed. The authors studied analytical-grade CoO. The sample was found to be monophase (like that of Co_3O_4), and its lattice parameter was in agreement with published data. To eliminate thermal diffusion, a continuous circulation of the gas mixture was maintained by means of a diffusion pump. Equilibrium was attained at a constant water vapor pressure (4.579 mm) which was maintained by dipping the receiver with water into a Dewar flask containing thawing ice. After equilibrium had been attained, the sample was removed from the furnace and hardened. From the vapor-gas mixture the water vapor was frozen out in a receiver immersed in liquid nitrogen. The equilibrium gas was again analyzed for impurities. This was made by interaction of H_2 with CoO which was again introduced into the furnace. The resultant water vapor was frozen out. The pressure difference gave the

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Equilibrium conditions in systems...

equilibrium pressure of H_2. It was converted by a correction diagram to the H_2 pressure at 0°C. The results are presented in Table 2. They may be expressed by the relation: $\log K'' = \frac{973.4}{T} + 0.52$. Also in this case, the equilibrium constant decreases with rising temperature, as the reaction $H^o_{298.1} = -631$ cal is exothermic. The change of the isobaric-isothermal potential is determined by $\Delta Z^o_T = -4457 - 2.381\ T$ cal. The dissociation pressure of CoO is calculated from $P_{O_2} = (K_{H_2O} K'')^2$ atm. It follows: $\log P_{O_2} = -\frac{24373}{T} + 7.14$, and the isobaric-isothermal potential $\Delta Z^o_T = 55754 - 16.333\ T$ cal. There are 2 tables and 13 references: 6 Soviet-bloc and 7 non-Soviet-bloc. The 3 most recent references to English-language publications read as follows: H. W. Foot, E. K. Smith (Ref. 4: J. Am. Chem. Soc., 30, 1344, 1908), P. H. Emmet, J. E. Schultz (Ref. 8: J. Am. Chem. Soc., 51, 3249, 1929), M. Watanabe (Ref. 10: Sci.

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Equilibrium conditions in systems....

Rep. Tohoku Imp. Univ., 22, no. 4, 892, 1933).

ASSOCIATION: Institut metallurgii Ural'skogo filiala Akademii nauk SSSR (Institute of Metallurgy of the Ural Branch of the Academy of Sciences USSR)

SUBMITTED: January 25, 1961

Legend to Table 2: 1) T, °K, 2) $P_{H_2}^{equil}$, mm Hg, 4) conditions; 5) K'' mean value; 6) from the side of reduction; 7) from the side of oxidation.

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S/020/61/139/005/012/021
B103/B217

AUTHORS: Bogoslovskiy, V. N., Stafeyeva, N. M., and Chufarov, G. I., Corresponding Member AS USSR

TITLE: Reduction of copper ferrite $CuFeO_2$ by graphite

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 139, no. 5, 1961, 1105-1106

TEXT: The authors studied, by means of graphite, the reduction kinetics of ferrite of monovalent copper, $Cu^{1+}Fe^{3+}O_2^{2-}$, of rhombohedral structure, and the crystallochemical transformations occurring. The ferrite was produced by sintering a mixture of stoichiometric composition $Cu_2O + Fe_2O_3$ during 28 hr at 1000°C in a CO_2 current. The specimens obtained were monophase (stated by x-ray diffraction). Reduction by graphite was conducted in vacuum of approximately 10^{-2} mm Hg. Methods have been described in detail (Fiz. met. i metalloved., 8, 740 (1959)). Experimental results at 900, 950, 1000, and 1050°C are given in Fig. 1. It is concluded that copper ferrite is reduced gradually. The process stops with 25% reduction at 900°C. Reduction

Reduction of copper ferrite $CuFeO_2$ ...

is more intensive at higher temperatures. First, the reaction is retarded (up to 50% reduction), then, however, accelerated. CO_2 and CO are the gaseous reaction products. Only CO_2 forms up to 33% reduction, from 50% reduction the ratio $CO : CO_2 = 1 : 1$. The CO_2 quantity gradually decreases with further reduction. The stepwise character of this reduction is confirmed by x-ray diffraction pattern in the solid phases at different reduction degrees. Copper and magnetite (the latter gives a spinel diffraction pattern) are detected besides initial ferrite in an early stage of reduction. Initial ferrite vanishes in 30% reduction whereas wüstite appears at 40%. Autocatalytic wüstite reduction begins after removal of 50% oxygen; copper, wüstite, and iron are detected in the solid reaction products. $CuFeO_2$ does not form solid solutions with magnetite. This was confirmed by the dependence of the oxygen equilibrium tension in the gaseous phase on the reduction degree. The exact results of this study are to be published later. It is the authors' opinion that no remarkable volume diffusion of metal cations or oxygen ions by the layers of solid reaction products occurs, since there is no mutual solubility between initial oxide and its reduction products. Surface diffusion plays an important part in this process. It

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Reduction of copper ferrite $CuFeO_2$ ...

leads to a growth of copper and magnetite crystals on the surface of ferrite particles during reduction. In the fine powder used by the authors, ferrite was transformed to magnetite and copper sooner than magnetite reduction began. There are 1 figure and 6 references: 3 Soviet-bloc and 3 non-Soviet-bloc. The three references to English-language publications read as follows: A. Pabst, Am. Min., 31, 539 (1946); C. Delorme, F. Bertaut, J. Phys. Rad., 14, 129 (1953); W. Soller, A. J. Thompson, Phys. Rev., 47, 644 (1935);

ASSOCIATION: Institut metallurgii Ural'skogo filiala Akademii nauk SSSR (Institute of Metallurgy of the Ural Branch of the Academy of Sciences USSR)

SUBMITTED: April 21, 1961

Card 3/5

S/020/61/140/006/029/030
B103/B101

AUTHORS: Chufarov, G. I., Corresponding Member AS USSR, and Shabalina, O. K.

TITLE: Mechanism and kinetics of wustite decomposition

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 6, 1961, 1392-1393

TEXT: The decomposition of wustite on its free surface and the quantitative characteristics of the decomposition kinetics were studied. Wustite produced by oxidation of Armco iron in $CO-CO_2$ atmosphere was chipped off and tempered in vacuo at 350°C. Phase composition and parameter were determined by x-ray structural analysis. Polystyrene carbon replicas of the free surface of the specimens were examined electron microscopically. The magnetic saturation moment was measured by means of magnetic analysis in a ballistic apparatus. Wustite had a parameter of 4.295 Å in its original state. This corresponds to the formula $Fe_{0.907}O$. It has been found that decomposition begins on the outer surface of the scale and is here more intensive, since this surface is richer in O_2. Primary magnetite

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Mechanism and kinetics of...

forms on both surfaces as thin and flat formations according to the reaction: $(1-4y)Fe_{1-x}O \longrightarrow (1-4x)Fe_{1-y}O + (x-y)Fe_3O_4$; $x > y$ (1). The resulting metastable wustite contains much less oxygen in the surface layers ($Fe_{0.984}O$) than in the center ($Fe_{0.963}O$). This is indicative of strong decomposition on the free surface, where crystallochemical conversion is much easier. Eutectoid decomposition is determined based on the occurrence of iron and the constancy of the parameter of metastable wustite. It proceeds according to the reaction: $4Fe_{1-y}O \longrightarrow Fe_3O_4 + (1-4y)Fe_\alpha$ (2). This decomposition is accompanied by a characteristic change of the surface microstructure. Numerous fine pores (of about 0.1 μ) are formed. The mechanism of this process is: On leaving the wustite lattice iron ions leave vacancies. These coagulate to micropores which are not overgrown by the magnetite originating from wustite. Additional annealing of the specimens (at 500°C) after decomposition reduced the porosity and revealed clearly the microstructure. Both the large primary magnetite crystals and the eutectoid could be easily distinguished. Microcrystals (of about 0.5 μ) of the secondary magnetite became visible

Mechanism and kinetics of...

in the eutectoid. Presumably, the iron content of the eutectoid is insignificant (about 13 % by volume). Probably, Fe forms intermediate layers between the magnetite microcrystals. The curve $\sigma_s(t)$ was plotted (Fig. 4) as a result of magnetic analysis and shows that the specific intensity of saturation magnetization of wustite specimens is a function of the annealing time at 350°C. The experimental values of σ_s could be used to determine the decomposition degree in any intermediate stage and to estimate the decomposition rate in different periods. This became possible owing to the constancy of the quantitative interrelations between the phases formed. The rate during the first period (pre-eutectoid separation of magnetite) exceeds that of the second period (eutectoid decomposition) by a factor of about seven. There are 4 figures and 6 references: 3 Soviet and 3 non-Soviet.

ASSOCIATION: Institut metallurgii Ural'skogo filiala Akademii nauk SSSR (Institute of Metallurgy of the Ural Branch of the Academy of Sciences USSR), Ural'skiy politekhnicheskiy institut im. S. M. Kirova (Ural Polytechnic Institute imeni S. M. Kirov)

S/020/61/140/006/029/030
B103/B101

Mechanism and kinetics of...

SUBMITTED: March 9, 1961

Fig. 4. The curve $\sigma_s(t)$ at 350°C.

Legend: (a) hr.

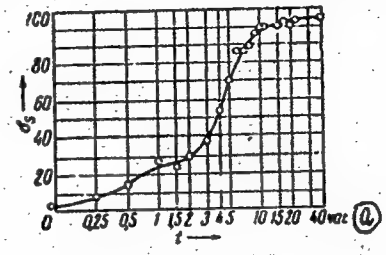

FIG. 4

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POPOV, G.P.; CHUFAROV, G.I.

Activities, heats, and entropies of mixing in $NiFe_2O_4$ solid solutions. Dokl. AN SSSR 141 no.4:877-879 D '61. (MIRA 14:11)

1. Institut metallurgii Ural'skogo filiala AN SSSR. 2. Chlen-korrespondent AN SSSR (for Chufarov).
(Solutions, Solid)

S/126/62/013/005/020/031
E111/E435

AUTHORS: Shabalina, O.K., Chufarov, G.I.

TITLE: Mechanism and kinetics of the decomposition of wustite. II

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.5, 1962, 766-768

TEXT: In an earlier paper (FMM, v.12, no.5, 1961, 697) work on wustite decomposition at 350°C was reported. In this paper wustite decomposition at 400 and 500°C was studied. In the present work the same batch of wustite was used in the form of plates of scale 0.3 mm thick with a lattice parameter of 4.302 Å corresponding to $Fe_{0.925}O$. Annealing was carried out in vacuo (10^{-4} mm Hg). The saturation magnetization was determined as a function of annealing time, the same specimen being used for constructing a complete curve. X-ray patterns were taken from the same specimen to obtain the phase analysis of the inside and outside of the scale. A separate specimen, which had undergone the same treatment as the other specimen, was used for the X-ray

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S/126/62/013/005/020/031
E111/E435

powder method determination of lattice parameter. Changes in the surface microstructure during decomposition were followed with the aid of an electron microscope (resolution 100 Å). The work suggested that in addition to the iron + magnetic eutectoid the surface contains primary magnetite crystals. The decomposition must follow the equation

$$4Fe_{1-x}O \longrightarrow Fe_3O_4 + (1 - 4x)Fe, \quad (x = 0.075)$$

The process at 500°C is much slower than at 350°C and is different in other ways. This is explicable on the basis of the two-stage mechanism. There are 2 figures.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S.M.Kirova
Institut metallurgii Ural'skogo filiala AN SSSR
(Ural Polytechnical Institute imeni S.M.Kirov,
Metallurgy Institute of the Ural Branch AS USSR)

SUBMITTED: September 23, 1961

S/076/62/036/011/008/021
B101/B180

AUTHORS: Averbukh, B. D., Braynina, D. Z., Antonov, V. K., and Chufarov, G. I. (Sverdlovsk)

TITLE: Study of equilibrium conditions in the reduction of manganese ferrite by hydrogen

PERIODICAL: Zhurnal fizicheskoy khimii, v. 36, no. 11, 1962, 2436 - 2441

TEXT: To find out the structure of ferrites and suitable conditions for their production, the reduction of manganese ferrite in hydrogen was studied at 900°C. Manganese ferrites of different compositions were produced by sintering Fe_2O_3 - MnO mixtures at 1200°C in various atmospheres (CO_2, Ar, $CO_2 + O_2$, or air), and by sintering Fe_2O_3 - MnO - Mn_3O_4 mixtures. Debye patterns showed that the resulting ferrites were single-phase. The reduction was performed in a mixture of water vapor (P_{H_2O} = 4.579 mm Hg) and hydrogen (P_{H_2} = 10^{-3} - 10^{2} mm Hg). After equilibrium had been established

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Study of equilibrium conditions in...

between ferrite and gas mixture, the water was frozen out, the p_{H_2} measured, the degree of reduction determined from the H_2 consumption, and p_{O_2} the equilibrium pressure calculated. The phases formed in the reduced ferrite were identified by Debye patterns. Results: Except for those in air, which were higher due to oxidation, the ferrites sintered in different atmospheres showed approximately the same p_{H_2O}/p_{H_2} values with the same degree of reduction. Ferrites containing excess manganese owing to admixture of Mn_3O_4, showed higher p_{O_2} due to formation of $Mn_3O_4 - MnFe_2O_4$ solid solutions. During the ferrite reduction, the lattice constant of the spinel phase gradually fell until it was roughly the same as for magnetite. At 10% reduction, a lower oxide phase appeared with an NaCl lattice, the constant of which increased as the reduction proceeded. At 45% reduction, a metallic phase appeared, with the lattice constant of iron (2.861 Å). The reduction of manganese ferrite thus proceeds in two stages: (1) Reduction to the lower oxide phase (Fe, Mn)O via formation of non-ideal solid

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Study of equilibrium conditions in... S/076/62/036/011/008/021
B101/B180

solutions of $MnFe_2O_4$ and Fe_3O_4; (2) reduction of the lower oxide phase to iron. a the activities and γ the activity coefficients were calculated for the solid solutions (Table 3). There are 6 figures and 3 tables. The most important English-language reference is: P. K. Foster a. A. J. E. Welch, Trans. Faraday Soc., 52, 1636, 1956.

ASSOCIATION: Institut metallurgii, Ural'skiy filial Akademii nauk SSSR-
(Institute of Metallurgy, Ural Branch of the Academy of Sciences USSR)

SUBMITTED: July 3, 1961

Card 3/4

S/020/62/142/002/028/029
B101/B144

AUTHORS: Shabalina, O. K., and Chufarov, G. I., Corresponding Member AS USSR

TITLE: The maximum rate of decomposition of wustite

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 2, 1962, 411-412

TEXT: The rate of thermal decomposition of wustite at 400 and 500°C was investigated. The decomposition products were subjected to X-ray structural and electron-microscopic examinations, and the kinetics of the process was clarified by measuring the variation in specific magnetization saturation σ_s during heating. Decomposition follows the reaction $4Fe_{1-x}O \rightarrow Fe_3O_4 + (1 - 4x)Fe$; $x = 0.093$. Details of the process: The preeutectoid separation of Fe_3O_4 and eutectoid decomposition are caused by diffusion of iron ions out of lattice points; coagulation of vacancies to pores which are not immediately filled with Fe_3O_4. This porosity facilitates the transformation of neighboring sections. Recrystallization, however, is also accelerated with increasing temperature. The pores are

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The maximum rate of decomposition...

closed, and the total rate of the process decreases. There are 1 figure and 3 references: 1 Soviet and 2 non-Soviet.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S. M. Kirova (Ural Polytechnic Institute imeni S. M. Kirov); Institut metallurgii Ural'skogo filiala Akademii nauk SSSR (Institute of Metallurg, of the Ural Branch of the Academy of Sciences USSR)

SUBMITTED: September 22, 1961

Card 2/2

STAFEYEVA, N.M.; BOGOSLOVSKIY, V.N.; SHCHEPETKIN, A.A.; ZHURAVLEVA, M.G.; CHUFAROV, G.I.

Equilibrium conditions in the reduction of copper ferrite $CuFe_2O_4$ by hydrogen. Dokl. AN SSSR 146 no.4:874-876 O '62. (MIRA 15:11)

1. Institut metallurgii Ural'skogo filiala AN SSSR.
2. Chlen-korrespondent AN SSSR (for Chufarov).

(Copper ferrate)
(Hydrogen)

L 11156-63 EWT(1)/BDS--AFFTC/ASD--IJP(C)
ACCESSION NR: AP3000601 S/0181/63/005/005/1286/1290

AUTHOR: Men', A. N.; Polyakov, V. P.; Smolenskiy, G. A.; Chufarov, G. I.

TITLE: Effect of near order on the magnetic properties of ferrimagnetic substances with garnet structure

SOURCE: Fizika tverdogo tela, v. 5, no. 5, 1963, 1286-1290

TOPIC TAGS: ferrimagnetism, garnet, saturation magnetization

ABSTRACT: A study was made of saturation magnetization in solid solutions of garnet containing nonmagnetic ions in tetrahedral and octahedral sites. This study was made with proper calculations for effect of near order and was undertaken to refine the magnetization theory of Gilleo. A comparison was made between theory and experiment for a solid solution of (1-x)Y sub 3 Fe sub 5 O sub 12-xCa sub 3 Fe sub 2 Si sub 3 O sub 12. This comparison is shown graphically in Fig. 1. It was found that calculations involving near order produce a shift in points at the extremes of the curve representing the relation of saturation magnetism to concentration. Comparison of theory with experiment may define two parameters, proposed in theory, that relate the energies of paired interactions. Orig. art. has: 1 figure and 23 formulas.

Metallurgical Institute UFAN; Institute of Semiconductors, Academy of Sciences

Card 1/4

LEONT'YEV, L.I.; BOGOSLOVSKIY, V.N.; CHUFAROV, G.I.

Problem of the existence of solid solutions between mono- and dicalcium ferrites. Zhur.neorg.khim. 8 no.1:257-258 Ja '63. (MIRA 16:5)

1. Institut metallurgii Ural'skogo filiala AN SSSR.
(Calcium ferrates) (Solutions, Solid)

S/126/63/015/002/004/033
E059/E420

AUTHORS: Bogoslovskiy, V.N., Startseva, I.Ye., Zhuravleva, M.G., Shchepetkin, A.A., Chufarov, G.I., Shur, Ya.S.

TITLE: The effect of phase composition on the magnetic properties of magnesium-manganese ferrite with a rectangular hysteresis loop

PERIODICAL: Fizika metallov i metallovedeniye, v.15, no.2, 1963, 181-186

TEXT: A magnesium-manganese ferrite with a rectangular hysteresis loop and with a sufficiently simple composition was used to facilitate the interpretation of the results obtained. Toroidal samples 12 mm outer dia, 8 mm inner dia and 3 mm high were used. After a second annealing in air at 1200°C they were cooled in a CO_2 atmosphere. The composition was Fe_2O_3 - 42.8 mol%, MgO - 14.4%, MnO - 42.8% (as $MnCO_3$) which corresponds with the formula

$$(MgFe_2O_4)_{0.3}(MnFe_2O_4)_{0.6}(Mn_3O_4)_{0.1}$$

The dependence of the coercive force H_c, the residual

Card 1/2

The effect of phase ...

induction B_r, the maximum induction B_m, the induction in the field of 90 Oe B_{90}, and B_r/B_m on the pressure of oxygen when annealing at 600°C was investigated. B_r shows a steady decrease with increasing oxygen pressure up to 150 mm Hg, while for the other parameters there is little change for oxygen pressures above 50 mm. Maximum squareness of the hysteresis loop is obtained at 10 mm pressure of oxygen. A comparison of the results of physicochemical analysis, X-ray and magnetic investigation suggests that the spontaneous rectangularity of the hysteresis loop in this ferrite depends on the presence of the Mn^{3+} ion which leads to local distortions in the crystal lattice. There are 2 figures.

ASSOCIATIONS: Institut metallurgii UFAN SSSR
(Institute of Metallurgy UFAN USSR)
Institut fiziki metallov AN SSSR
(Institute of Physics of Metals AS USSR)

SUBMITTED: August 10, 1962

Card 2/2

SHABALINA, O.K.; CHUFAROV, G.I.

Mechanism and kinetics of the decomposition of wüstite.
Fiz. met. i metalloved. 15 no.5:690-696 My '63. (MIRA 16:8)

1. Ural'skiy politekhnicheskiy institut im. S.M. Kirova i
Institut metallurgii Ural'skogo filiala AN SSSR.
(Wustite)

S/076/63/037/003/009/020
B101/B215

AUTHORS: Popov, G. P., Chufarov, G. I. (Sverdlovsk)

TITLE: Study of the mechanism and equilibrium conditions for the reduction of nickel ferrite by hydrogen

PERIODICAL: Zhurnal fizicheskoy khimii, v. 37, no. 3, 1963, 586-594

TEXT: The reduction of $NiFe_2O_4$ was conducted by a mixture of $H_2 + H_2O$ circulating in a vacuum apparatus, and the degree of ferrite reduction was calculated from the H_2 consumption. Debye patterns were used to check the coexistent solid phases and determine the lattice constants according to A. J. Bradley, A. H. Jay, and A. Taylor (Philos. Mag., 23, 545, 1937). The formation of continuous solid solutions of $NiFe_2O_4$ in Fe_3O_4 was observed, metallic Ni being formed with lattice constant of 3.52 Å remaining unchanged up to a reduction degree of 20%, and with 3.56 Å up to 60% reduction owing to Fe accumulation. The spinel

Study of the mechanism and ...

reduction is completed at 60% reduction, then FeO reduction follows and the lattice constant of the metallic phase increases to 3.584 Å. For the solid $NiFe_2O_4$-Fe_3O_4 solution, K_{equ}, ΔH^{o}_{298}, ΔZ, ΔS, and ΔF, as well as the activity coefficients a_{ferr}, a_{magn} of ferrite and magnetite were calculated and tabulated. The negative deviation of the curves a_{ferr} versus concentration, and a_{magn} versus concentration suggests that Ni^{2+} ions during $NiFe_2O_4$ dissolution in Fe_3O_4 tend to occupy octahedron nods, and that Fe^{2+} ions during the dissolution of Fe_3O_4 in $NiFe_2O_4$ show the same tendency. Thus a short-range order forms in the $NiFe_2O_4$-Fe_3O_4 system. There are 5 figures and 3 tables.

ASSOCIATION: Akademiya nauk SSSR Ural'skiy filial Institut metallurgii (Academy of Sciences USSR, Ural Branch, Institute of Metallurgy)

SUBMITTED: January 2, 1962

Card 2/2

S/020/63/148/002/029/037
B189/B101

AUTHORS: Popov, G. P., Simonova, M. I., Ugol'nikova, T. A., Chufarov, G. I., Corresponding Member AS USSR

TITLE: Thermodynamic properties and crystallochemical characteristics of the solid solutions of zinc ferrite and magnetite

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 2, 1963, 357 - 360

TEXT: The thermodynamic functions and the lattice constant of the solid $ZnFe_2O_4$ - Fe_3O_4 solutions having the composition $Zn_{1-x}Fe_{2+x}O_4$ were calculated from the equilibrium constants of the reduction of $ZnFe_2O_4$ with H_2, determined experimentally at 600, 700, and 900°C, as a function of x. Thermodynamic data:

x	$-\Delta H^o_{298}$ kcal/mole	$-\Delta Z^o_{298}$ kcal/mole	S^o_{298} cal/g-mole	composition of the solid solution
0.00	283.5	255.5	30.78	$ZnFe_2O_4$
0.27	275.5	250.0	30.40	$Zn_{0.7}Fe_{2.3}O_4$

Card 1/3

Thermodynamic properties ...

X	$-\Delta H^{o}_{298}$ kcal/mole	$-\Delta Z^{o}_{298}$ kcal/mole	S^{o}_{298} cal/g-mole	composition of the solid solution
0.52	273.8	246.0	33.0	$Zn_{0.5}Fe_{2.5}O_4$
0.72	269.3	241.0	33.3	$Zn_{0.3}Fe_{2.7}O_4$
0.92	266.6	240.0	34.0	$Zn_{0.1}Fe_{2.9}O_4$
1.00	270.0	242.0	35.00	Fe_3O_4

X is the molar part of Fe_3O_4 in $Zn_{1-x}Fe_{2+x}O_4$; the data for Fe_3O_4 are taken from publications. The lattice constant decreases slowly from 8.445 Å for $ZnFe_2O_4$ to 8.44 Å for $Zn_{0.7}Fe_{2.3}O_4$ and then linearly to 8.40 Å for Fe_3O_4. The curve S^{o}_{298} versus x has the same salient point at $x = 0.3$. It is concluded, therefore, that the inversion of the spinels remains almost unchanged between $0 \leq x \leq 0.3$ and that only Zn^{2+} ions are substituted by the Fe^{2+} ions in the tetrahedron points. These ions are almost of equal size. Between $x = 0.3$ and $x = 1$, however, the intensive inversion to total inverse spinel,

Thermodynamic properties ...

the magnetite takes place, owing to the redistribution of the cations in the tetrahedron and octahedron interstice. There are 3 figures and 1 table.

ASSOCIATION: Institut metallurgii Ural'skogo filiala Akademii nauk SSSR (Institute of Metallurgy of the Ural Branch of Academy of Sciences USSR); Institut fiziki metallov Akademii nauk SSSR (Institute of Physics of Metals of the Academy of Sciences USSR)

SUBMITTED: July 14, 1962

Card 3/3

S/020/63/148/004/024/025
B192/B101

AUTHORS: Shabalina, O. K., Chufarov, G. I., Corresponding Member AS SSSR

TITLE: Decomposition kinetics of wüstite

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 4, 1963, 890-892

TEXT: The decomposition kinetics of wüstite was studied by measuring the specific saturation magnetization $\sigma_s(t)$ as a function of time in samples with a lattice constant of 4.032 Å between 200°C and 500°C. The measured curves show that two successive reactions take place below 400°C: (1) a pre-eutectic separation of magnetite, and (2) a eutectic decomposition of metastable wüstite; while there is only one above 400°C: (3) eutectic decomposition of the original wüstite. The molar fraction $\alpha(t)$ of the converted material was calculated from the experimental data. The behavior of $\alpha(t)$ is determined by the number N of pores in the material. For $\alpha \leq 1/2$, the measured points satisfy the equation $\alpha/(1-\alpha) = \exp(kt - b_1)$, where k and b_1 are constants; the equation is valid on the assumption that N is

Card 1/2

Decomposition kinetics of wüstite

proportional to α. For $\alpha \geq 1/2$, the measured points follow the relation $\alpha/(1 - \alpha) = \exp(b_2 - 2nt^{-1/2})$, where $n = k'/D^{3/2}$; k' and b_2 are constants. This equation is valid on the assumption that N is proportional to $\alpha(Dt)^{-3/2}$, where D denotes the diffusion coefficient of vacancies. In the reactions (1) and (2), k increases with the temperature up to a saturation value at ~400°C and decreases in reaction (3). In all three reactions, n is practically equal and independent of temperature; b_2 increases below 400°C and decreases above this temperature. There are 3 figures.

ASSOCIATION: Institut metallurgii Ural'skogo filiala Akademii nauk SSSR (Institute of Metallurgy of the Ural Branch of the Academy of Sciences USSR)

SUBMITTED: October 1, 1962

L 12902-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD

ACCESSION NR: AP3003555 S/0020/63/151/002/0347/0349 58 57

AUTHORS: Stafeyeva, N. M.; Shchepetkin, A. A.; Bogoslovskiy, V.N.; Zhuravleva, M.G.; Chufarov, G.I. (Corr. member, Academy of Sciences SSSR)

TITLE: Study of equilibrium condition during hydrogen reduction of ferrite Mg sub 0.5 Mn sub 0.5 Fe sub 2 O sub 4 27

SOURCE: AN SSSR. Doklady, v. 151, no. 2, 1963, 347-349

TOPIC TAGS: equilibrium conditions, hydrogen, hydrogen reduction, ferrite, magnesium ferrite, manganese ferrite, solid phase, lattice, S-ray analysis

ABSTRACT: Reduction of ferrite Mg sub .5Mn sub .5Fe_2O_4 was studied under equilibrium conditions at 800, 900 and 1000 degrees C. Partial pressure of oxygen during dissociation of the ferrite was calculated. Composition of solid phases existing during the various reduction stages was determined. Ferrite Mg sub .5Mn sub .5Fe_2O_4 is a solid solution of magnesium and manganese ferrites with a 1:1 molar ratio. The original sample was obtained by heating a mixture of the required

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L 12902-63

ACCESSION NR: AP3003555

O

amounts of MgO, MnO and Fe_2O_5 in CO_2 atmosphere at 1200 degrees for 30 hours. Reduction was carried out in a closed evacuated system through which a mixture of hydrogen and water vapor was circulated until equilibrium was reached. Water vapor was maintained at a pressure equal to that of saturated water vapor at 0 degrees C. Partial pressure of hydrogen in the gaseous equilibrium mixture was determined after freezing out the water vapor in a trap immersed in liquid nitrogen. Partial pressure of oxygen was determined from the values $K = \frac{P_{H_2O}}{P_{H_2}}$. Extent of reduction was determined from the hydrogen consumption. A reduction of 100% was assumed for an oxide having the conposition Mg sub .5Mn sub .50. Solid phases existing at equilibrium were subjected to X-ray analysis (Debye method and with a camera with a 57.3mm diameter). Photographs were taken under FeK illumination using a manganese filter. Relationships between partial pressure of oxygen at equilibrium and the extent of reduction of the ferrite Mg sub .5Mn sub .5Fe_2O_4 at 800, 900 and 1000 degrees C are presented. Relationships between the size of lattices

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L 12902-63

ACCESSION NR: AP3003555

in the three solid phases and the extent of reduction, as well as relationships between the concentration of the various phases and the extent of ferrite reduction are given. Orig. art. has: 3 figures.

ASSOCIATION: Institut metallurgii Ural'skogo filiala Akademii nauk SSSR, Sverdlovsk (Metallurgical Institute, Ural branch, Academy of Sciences, SSSR)

SUBMITTED: 01Apr63 DATE ACQ: 30Jul63 ENCL: 00

SUB CODE: CH NO REF SOV: 004 OTHER: 006

Card 3/3

SHCHEPETKIN, A.A.; KHROMYKH, L.G.; BOGOSLOVSKIY, V.N.; ZHURAVLEVA, M.G.; CHUFAROV, G.I.

Equilibrium conditions during the reduction of magnesium ferrite by hydrogen. Dokl. AN SSSR 152 no.1:124-126 S '63. (MIRA 16:9)

1. Institut metallurgii Ural'skogo filiala AN SSSR. 2. Chlen-korrespondent AN SSSR (for Chufarov).
(Magnesium ferrates) (Reduction, Chemical)

STAFEYEVA, N.M.; CHUFAROV, G.I.

Reduction of copper ferrites by hydrogen. Zhur. prikl. khim. 36 no.10:2296-2297 O '63. (MIRA 17:1)

POPOV, G. P.; CHUFAROV, G. I. (Sverdlovsk)

M chanism and equilibrium conditions of nickel ferrite reduction by hydrogen. Zhur. fiz. khim. 37 no. 3:586-594 Mr '63. (MIRA 17:5)

1. Institut metallurgii Ural'skiy filial AN SSSR.

STAFEYEVA, N.M.; ZHURAVLEVA, M.G.; BOGOSLOVSKIY, V.N.; CHUFAROV, G.I.

Effect of Na_2CO_3 and K_2CO_3 additions on the reduction of oxides and copper ferrites. Zhur. neorg. khim. 9 no.2:447-450 F'64. (MIRA 17:2)

BOGOSLOVSKIY, V.N.; SHCHEPETKIN, A.A.; STARTSEVA, I.Ye.; ANTONOV, V.K.; CHUFAROV, G.I.; SHUR, Ya.S.

Effect of phase composition on the magnetic properties of the magnesium-manganese iron ferrite with a rectangular hysteresis loop. Fiz.met. i metalloved. 18 no.5:711-716 N '64. (MIRA 18:4)

1. Institut metallurgii, Sverdlovsk i Institut fiziki metallov AN SSSR.

ACCESSION NR: AP4039618 S/0076/64/038/005/1135/1141

AUTHOR: Shchepetkin, A. A. (Sverdlovsk); Stafeyeva, N. M. (Sverdlovsk); Bogoslovskiy, V. N. (Sverdlovsk); Zhuravleva, M. G. (Sverdlovsk); Chufarov, G. I. (Sverdlovsk)

TITLE: Study of equilibrium conditions during the reduction of magnesium-manganese ferrites

SOURCE: Zhurnal fizicheskiy khimii, v. 38, no. 5, 1964, 1135-1141

TOPIC TAGS: magnesium-magnetite ferrite, ferrite dissociation, ferrite reduction, equilibrium oxygen pressure, ferrite crystalline structure, spinel phase, magnesioferrite, magnetite

ABSTRACT: The equilibrium oxygen pressure during the dissociation of magnesium-manganese ferrites (I) of the composition $Mg_cMn_{1-c}Fe_2O_4$ (c = 0.1 to 1.0) have been determined and some peculiarities of the crystalline structure of I of various compositions have been studied. This work was done because such data are helpful for the preparation of ferrites and the understanding of changes occurring in service. The equilibrium conditions in the reduction of I were determined in a closed vacuum apparatus with a circulating $H_2 + H_2O$ mixture. The equilibrium

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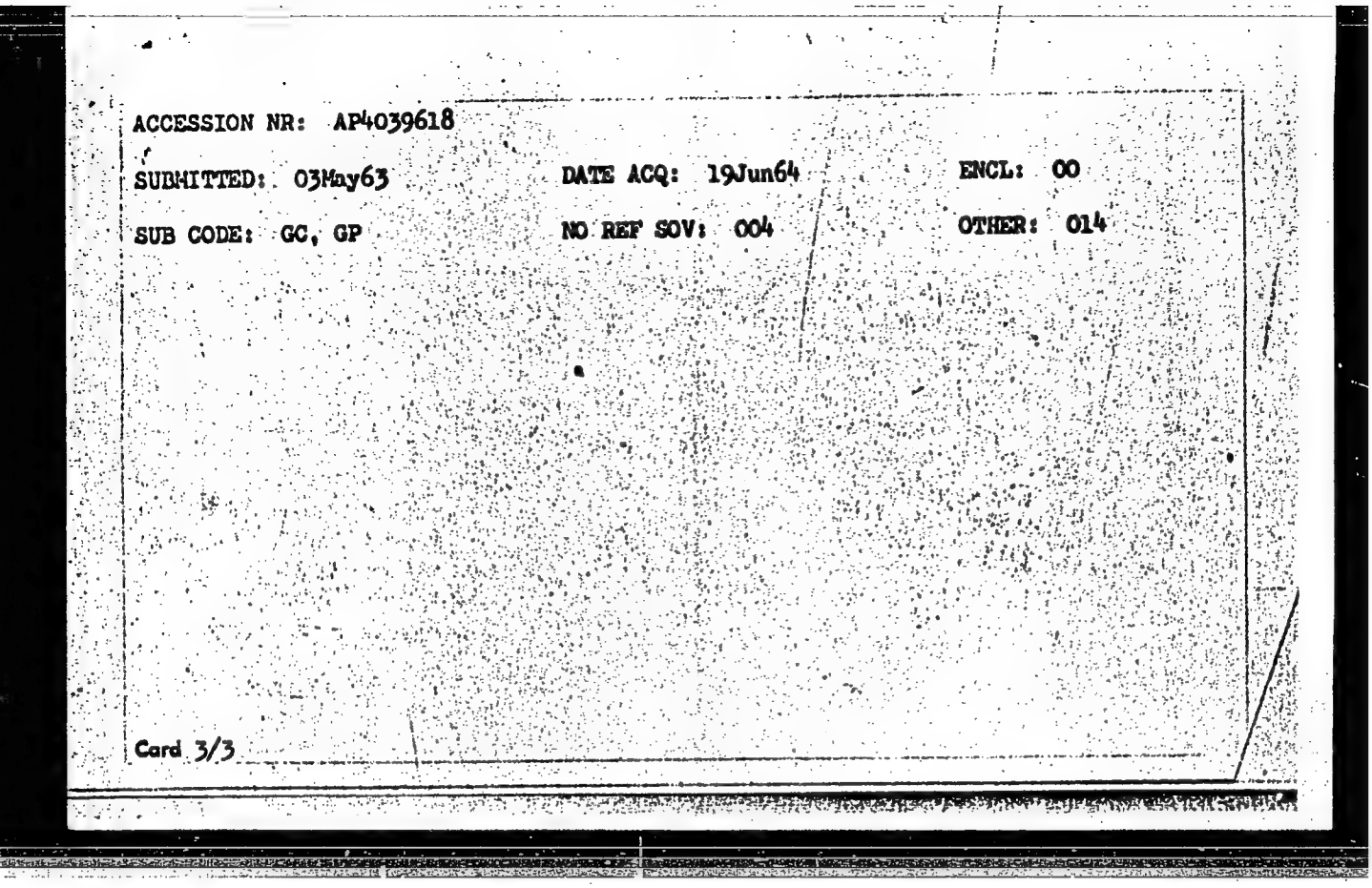
ACCESSION NR: AP4039618

oxygen pressure was calculated from the formula $p_{O_2}^{1/2} = K_p K_{H_2O}$, where K_p is the H_2O/H_2 pressure ratio in an equilibrium gas mixture and K_{H_2O} is the equilibrium constant of the water vapor dissociation. X-ray analysis of I and of their reduction products was carried out by the Debye method. It was shown that the oxygen pressure remains almost constant (10^{-13} atm) with an increase of the magnesioferrite content in the solid solution from 0 to 50 mol. %; the pressure increased sharply (to 10^{-11} atm) with an increase of the magnesioferrite content from 50 to 100 mol. %. The oxygen pressure dropped sharply in the course of the reduction of I by hydrogen. X-ray analysis of the solid phases formed during the reduction revealed a correlation between the oxygen pressure and the chemical characteristics of the crystals (magnesium ion fraction in the tetrahedral lattice nodes) of I. It was shown, in particular, that during the reduction the equilibrium oxygen pressure drops with a decrease in the magnesioferrite content and an increase in the magnetite content in the spinel phase and approaches, at 33% reduction, the dissociation pressure of magnetite. Orig. art. has 7 figures.

ASSOCIATION: Institut metallurgii Ural'skogo filiala AN SSSR (Institute of Metallurgy, Ural Branch, AN SSSR)

Card 2/3



ACCESSION NR: AP4039618

SUBMITTED: 03May63 DATE ACQ: 19Jun64 ENCL: 00

SUB CODE: GC, GP NO REF SOV: 004 OTHER: 014

Card 3/3

ACCESSION NR: AP4042598 S/0076/64/038/007/1811/1815

AUTHOR: Braynina, D. Z. (Sverdlovsk); Averbukh, B. D. (Sverdlovsk); Zhuravleva, M. G. (Sverdlovsk); Chufarov, G. I. (Sverdlovsk)

TITLE: Equilibrium conditions in the hydrogen reduction of manganese-zinc ferrites

SOURCE: Zhurnal fizicheskoy khimii, v. 38, no. 7, 1964, 1811-1815

TOPIC TAGS: manganese ferrite, zinc ferrite, manganese zinc ferrite, ferrite reduction, ferrite dissociation, ferrite crystal structure, spinel structure, inverse spinel structure

ABSTRACT: Equilibrium conditions at 700 to 900C for the initial stages of hydrogen reduction of manganese-zinc ferrites of varying composition are investigated. The equilibrium constants were determined experimentally and the equilibrium partial pressures of oxygen following dissociation of the ferrites were calculated. The lattice constants were measured. It was shown that both the equilibrium partial pressure of oxygen and the lattice constants of manganese-zinc ferrites depend in a nonlinear manner on the composition. It

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ACCESSION NR: AP4042598

was found that the dissociation pressure of $Mn_xZn_{1-x}Fe_2O_4$ increases at first from the x value corresponding to a zinc ferrite to a maximum with a 70% zinc ferrite content, then drops to the x value for $MnFe_2O_4$. The change in the constants of the crystal lattices of the solid solutions agrees with the fact that manganese ferrite is inverted by about 20%. Orig. art. has: 5 figures, 1 table, and 2 formulas.

ASSOCIATION: Institut metallurgii (Institute of Metallurgy)

SUBMITTED: 11Oct63 ENCL: 00

SUB CODE: MM, SS NO REF SOV: 005 OTHER: 013

Card 2/2

CHUFAROV, G.I.; LEONT'YEV, L.I.

Reduction of calcium ferrites by hydrogen under equilibrium conditions. Dokl. AN SSSR 154 no.4:881-882 F '64.
(MIRA 17:3)

1. Institut metallurgii, Sverdlovsk. 2. Chlen-korrespondent AN SSSR (for Chufarov).

MEN', A.N.; STAFEYEVA, N.M.; BOGOSLOVSKIY, V.N.; ZHURAVLEVA, M.G.; CHUFAROV, G.I.

Thermodynamic analysis of equilibrium in the dissociation of ferrites. Dokl. AN SSSR 156 no. 4:912-915 Je '64. (MIRA 17:6)

1. Institut metallurgii, Sverdlovsk. 2. Chlen-korrespondent AN SSSR (for Chufarov).

L 1184-65 EEC-2/EWT(1)/EWT(m)/EWP(b)/T/EWP(t) APWL/ASD/AEDC(a)/AS(mp)-2/
ESD(gp) JD

ACCESSION NR: AP4044888 S/0020/64/157/006/1441/1444

AUTHOR: Men', A. N.; Stafeyeva, N. M.; Bogoslovskiy, V. N.; Zhuravleva M. G.; Shafarov, G. I. (Corresponding member AN SSSR)

TITLE: Concerning the determination of the concentration dependence of some thermodynamic functions of solid solutions of ferrites

SOURCE: AN SSSR. Doklady*, v. 157, no. 6, 1964, 1441-1444

TOPIC TAGS: thermodynamic function, solid solution, ferrite, concentration dependence, configurational mixture entropy

ABSTRACT: The statistical computation of thermodynamic functions of solid solutions is complicated because of the large number of parameters which characterize the interactions of particles in the solid phase. Therefore, reasonable approximations are needed which give a good agreement with the experiment. The simplest statistical approach is the computation of the configurational entropy of mixture without consideration of the near order. The change of the configurational entropy $\Delta S^{cont.}$ for the solid solutions of copper ferrite at a given concen-

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L 21064-65
ACCESSION NR: AP4044888

tration c with copper magnetite is given as a function of the equilibrium degree λ of inversion of solid solution at a given temperature and λ_0 of the inversion of copper ferrite at the same temperature. If the function $\lambda(c)$ is not known, it can be assumed, in the first approximation, that $\lambda = \lambda_0 c$. For the calculation of ΔS^{cont}, the results of previous author's work (Fiz. tverd. tela, 4, 898 (1962)) are used.
Orig. art. has: 3 figures and 12 equations

ASSOCIATION: Institut metallurgii Sverdlovsk (Institute of Metallurgy)

SUBMITTED: 20Apr64 ENCL: 00

SUB CODE: TD, MM NO REF SOV: 005 OTHER: 004

Card 2/2

L 23325-65 EWG(j)/EWT(m)/EPF(c)/EPR/EWP(t)/EWP(b) Pr-4/Ps-4 IJP(c) JD
ACCESSION NR: AP4047330 S/0020/64/156/004/0949/0952

[illegible] Yu. A. Balakirev, V. F. [illegible], [illegible] presented by [illegible])

Investigation of the equilibrium conditions and the mechanism of hydrogen reduction of solid solutions in the Mg-Cr-Fe-O system

SOURCE: AN SSSR. Doklady*, v. 158, no. 4, 1964, 949-952

TOPIC TAGS: hydrogen reduction, magnesium ferrochromite, hydrogen reduction mechanism, magnetite, magnesium ferrite, magnesium chromite

ABSTRACT: The reduction of the magnesium ferrochromite $MgCr_{0.25}Fe_{1.75}O_4$ was investigated. The equilibrium oxygen pressure, the composition of the solid [illegible] in equilibrium with the gaseous phase under different reduction conditions, [illegible] dependence of the crystal lattice parameters of [illegible] $MgCr_{2-x}Fe_xO_4$ in the interval $0 \leq x \leq 2$ were determined. Original samples were prepared by sintering MgO, Fe_2O_3 and Cr_2O_3 at 1200C for 15 hours, holding at 1000C for 5 hours to protect the spinel structure in the solid solutions, and

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L 23325-65
ACCESSION NR: AP4047330

[illegible] Over 33.3% reduction gave a $MgCr_2O_4$ spinel phase, pure iron and [illegible] of the lower oxides MgO and FeO, whose [illegible] was determined from the lattice parameters. Up to 33.3% reduction was described by [illegible] spinel phase + $nMg_zFe_{1-z}O$ lower oxides + nH_2O [illegible], [illegible] P_{O_2} curve showed a break, the magnetite content was reduced from 16% to zero and the magnesium ferrite content, from 16% to zero. On reduction to 33.3% the ternary solid solution comprising the spinel phase became enriched in magnesium chromite. In the solutions between the spinel phase with different cation distributions (from $MgCr_2O_4$ to $MgFe_2O_4$) the crystal lattice parameter-composition dependency did not follow Vegard's law. Orig art. has: 3 equations, 1 table, and 3 figures.

ASSOCIATION: Institut metallurgii Sverdlovsk (Institute of Metallurgy)
SUBMITTED: 19May64 ENCL: 00
SUB CODE: GC NO REF SOV: 005 OTHER: 003

Card 2/2

L 23532-65 EWT(m)/T/EWP(t)/EWP(b) IJP(c) JD/JG

ACCESSION NR: AP4047946 S/0020/64/158/005/1108/1111

AUTHOR: Balakirev, V. F.; Simonova, M. I.; Chufarov, G. I. (Corresponding member AN SSSR)

TITLE: Equilibrium conditions and mechanism of the hydrogen reduction of solid solutions in the Fe-Cr-O system

SOURCE: AN SSSR, Doklady*, v. 158, no. 5, 1964, 1108-1111

TOPIC TAGS: Fe Cr O system, Fe Cr O H system, spinel reduction, magnetite reduction, iron chromite reduction, hydrogen reduction, reduction mechanism

ABSTRACT: Equilibria in the Fe-Cr-O and Fe-Cr-O-H systems at 1000C and the reduction at 1000C of $FeCr_{2-x}Fe_xO_4$ solid solutions when $0 \leq x \leq 2$, were investigated. Since the oxygen pressure in the solid solutions when $1.04 \leq x \leq 2$ exceeded the pressure, when wüstite dissociated to iron, wüstite was in equilibrium with these solid solutions and iron was not formed. The equilibrium hydrogen pressure decreased proportionally to the extent of wüstite reduction. When x=1.04, the spinel, wüstite and metallic phases were in equilibrium. When $x<1.04$ the

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L 23532-65
ACCESSION NR: AP4047946

continuous series of solid solutions were reduced directly to iron, by-passing the [illegible] phase. If the solid solutions are represented as solutions of magnetite in iron chromite, the magnetite is reduced completely before the iron chromite reduction started. The chromium remained in the spinel phase, enriching it and [illegible] form ferrochrome. The dependence of the lattice parameter on the composition of the spinel solid solution was not continuous; the extent of inversion λ [illegible] varying x was not uniform. When $0 \leq x \leq 0.7$ the solid solution was normal; in the $1.6 \leq x \leq 2$ region, inverted. The sharp increase in λ when $0.7 \leq x \leq 1.2$ caused a decreased in the lattice parameter of the spinel and in the $1.2 \leq x \leq 1.6$ region the increase in the parameter with change in the composition was compensated by its decrease because of the increased λ. Orig. art. has: 1 table and 1 figure

ASSOCIATION: Institut metallurgii, Sverdlovsk (Institute of Metallurgy)

SUBMITTED: 16Jun64 ENCL: 00 SUB CODE: MM, GC

NR REF SOV: 003 OTHER: 010

Card 2/2

ZHURAVLEVA, M.G.; MEN', A.N.; CHUFAROV, G.I.

Determination of the concentration dependence of the activity of components for simple binary oxides. Dokl. AN SSSR 159 no.4: 879-881 D '64 (MIRA 18:1)

1. Institut metallurgii, Sverdlovsk. 2. Chlen-korrespondent AN SSSR (for Chufarov).

KORNEYEV, Yu.A.; BALAKIREV, V.F.; CHUFAROV, G.I.

Phase relations in the spinel region of the system Mg-Al-Fe-O.
Dokl. AN SSSR 159 no.5:1091-1094 D '64 (MIRA 18:1)

1. Institut metallurgii , Sverdlovsk. 2. Chlen-korrespondent AN SSSR (for Chufarov).

BRAYNINA, D.Z.; MEN', A.N.; CHUDAKOV, V.S.; CHUFAROV, G.I.

Calculation of the "stabilization" energy of iron group ions in oxides having a spinel structure. Dokl. AN SSSR 160 no.2:379-382 Ja '65. (MIRA 18:2)

1. Institut metallurgii, Sverdlovsk. 2. Chlen-korrespondent AN SSSR (for Chufarov).

TAKENOV, T.D.; BALAKIREV, V.F.; CHUFAROV, G.I.

Phase equilibrium and the mechanism of reduction of solid solutions of manganese ferrite and chromite. Dokl. AN SSSR 160 no.6:1335-1338 F '65. (MIRA 18:2)

1. Institut metallurgii, Sverdlovsk. 2. Chlen-korrespondent AN SSSR (for Chufarov).

L 3763-65 EWT(m) JD/JH

ACCESSION NR: AP5018088 UR/0020/65/163/001/0144/0146

AUTHOR: Zhuravleva, M. G.; Men', A. N.; Chufarov, G. I. (Corresponding member AN SSSR)

TITLE: Investigation of spinel type solid solutions from the standpoint of statistical thermodynamics.

SOURCE: AN SSSR. Doklady, v. 163, no. 1, 1965, 144-146

TOPIC TAGS: statistical thermodynamics, spinel type solid solution, phase composition, effective equilibrium oxygen pressure, component activity, solid phase composition, configurational mixing entropy, internal mixing energy

ABSTRACT: This work is a continuation of a previous investigation with the difference that the statistical method of calculating the activities of components in MeO type solid solutions, which was found to be in satisfactory agreement with experiment, is now extended to the case of spinel type solid solutions in an equilibrium with a phase of variable composition. On the basis of the expression for the configurational mixing entropy and internal mixing energy!

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L 63763-65
ACCESSION NR: AP5018088

$$\Delta S = -R(\lambda_1 \ln \lambda_1 + \lambda_2 \ln \lambda_2 + (1 - \lambda_1 - \lambda_2) \ln (1 - \lambda_1 - \lambda_2) +$$
$$+ (c_1 - \lambda_1) \ln (c_1 - \lambda_1) + (c_2 - \lambda_2) \ln (c_2 - \lambda_2) + (1 + \lambda_1 + \lambda_2) \ln (1 +$$
$$+ \lambda_1 + \lambda_2) - c_1[\lambda_1^0 \ln \lambda_1^0 + 2(1 - \lambda_1^0) \ln (1 - \lambda_1^0) + (1 + \lambda_1^0) \ln (1 +$$
$$+ \lambda_1^0)] - c_2(\lambda_2^0 \ln \lambda_2^0 + 2(1 - \lambda_2^0) \ln (1 - \lambda_2^0) + (1 + \lambda_2^0) \ln (1 + \lambda_2^0)])$$

$$\Delta U = Nc_1c_2\alpha,$$

where $\alpha = v/kT$, N is the Avogadro number, and v is the algebraic sum of the energies of paired interactions between cations spaced at distances not exceeding the distance between tetranodes of the spinel, the authors derive a formula for the activities of components in the solid solution and apply it, by way of an example, to a solid solution of manganese ferrite with magnetite. The relation of log P_{O_2} (effective equilibrium oxygen pressure in the system) to ferrite concentration c_f is experimentally determined and found to be in satisfactory agreement with theory, and, on this basis, the activities of ferrite and magnetite are separately determined. The sublattice distribution of the cations is a major factor in the activity of ferrite. The system of formulas presented for the calculation of component activities is applicable for any solid solutions for which experimental data are available regarding the relation of log P_{O_2} to the composi-

Card 2/3

L 07763-65
ACCESSION NR: AP5018088

tion of the solid phases in an equilibrium. Orig. art has: 3 figures, 9 formulas.

ASSOCIATION: Institut metallurgii, Sverdlovsk (Metallurgy Institute)

SUBMITTED: 28Dec64 ENCL: 00 SUB CODE: SS, TD

NO REF SOV: 004 OTHER: 002

Card 3/3

KORNEYEV, Yu.A.; BALAKIREV, V.F.; MEN', A.N.; CHUFAROV, G.I.

Letters to the editors. Zhur.fiz.khim. 39 no.10:2625-2627 O '65.
(MIRA 18:12)

1. Sverdlovskiy institut metallurgii. Submitted March 11, 1965.

VOROB'YEV, Yu.P.; BOGOSLOVSKIY, V.N.; BOGACHOVA, Ye.G.; CHUFAROV, G.I.

Reduction of $FeV_{0,6}Fe_{1,4}O_4$ solid solution under equilibrium conditions. Dokl. AN SSSR 166 no.3:664-667 Ja '66.
(MIRA 19:1)

1. Institut metallurgii, Sverdlovsk. 2. Chlen-korrespondent AN SSSR (for Chufarov). Submitted June 29, 1965.

BOGOSLOVSKIY, V.N.; MEN', A.N.; CHUFAROV, G.I.

Thermodynamic analysis of equilibrium in the dissociation of ferrites. Dokl. AN SSSR 163 no.3:671-673 Jl '65. (MIRA 18:7)

1. Institut metallurgii, Sverdlovsk. 2. Chlen-korrespondent AN SSSR (for Chufarov).

KORNEYEV, Yu.A.; BALAKIREV, V.F.; CHUFAROV, G.I.

Thermodynamic analysis of $MgAl_2O_4$ - Fe_3O_4 solid solution. Dokl. AN SSSR 163 no.4:891-893 Ag '65. (MIRA 18:8)

1. Institut metallurgii, Sverdlovsk. 2. Chlen-korrespondent AN SSSR (for Chufarov).

L 06468-67 EWT(m)/EWP(t)/ETI IJP(c) JH/JD

ACC NR: AP6029210 SOURCE CODE: UR/0076/66/040/006/1234/1239

AUTHOR: Korneyev, Yu. A.; Balakirev, V. F.; Chufarov, G. I.

ORG: Sverdlovsk Metallurgy Institute (Sverdlovskiy institut metallurgii)

30
13

TITLE: Reduction of solid solutions of magnesium ferrite and chromite

SOURCE: Zhurnal fizicheskoy khimii, v. 40, no. 6, 1966, 1234-1239

TOPIC TAGS: magnesium compound, ferrite, chromite, solid solution, CHEMICAL REDUCTION

ABSTRACT: The solid solutions $MgFe_xCr_{2-x}O_4$ were obtained by sintering powdered MgO, Fe_2O_3 and Cr_2O_3 at 1200°C for 15 hr, then soaking at 1000°C for 5 hr and quenching in water. The reduction of $MgFe_{1.75}Cr_{0.25}O_4$ at 900, 1000 and 1100°C and the determination of equilibrium conditions were carried out in a vacuum unit in which an H_2+H_2O mixture circulated. X-ray diffraction was used to study the solid phases formed. It was found that Vegard's additivity law is not obeyed by solid solutions of magnesium ferrite and chromite. In the solid products of reduction of $MgFe_{1.75}Cr_{0.25}O_4$, when up to 33.3% of the latter has been reduced, the phases in equilibrium are a spinel phase of variable composition consisting of magnesium ferrite, magnesium chromite and magnetite, and a wüstite phase formed by ferrous oxide and magnesium oxide; when the reduction has proceeded beyond 33.3%, magnesium chromite, the solid solution MgO-FeO and iron are in equilibrium. The equilibrium pressure of oxygen was determined at

Card 1/2 UDC: 541.11

L 06468-67

ACC NR: AP6029210

various degrees of reduction of $MgFe_{1.75}Cr_{0.25}O_4$. The sequence of conversions involved in this reduction remains the same from 900 to 1100°C. Orig. art. has: 5 figures, 2 tables and 3 formulas.

SUB CODE: 07/ SUBM DATE: 10Jan65/ ORIG REF: 010/ OTH REF: 007

Card 2/2 mlf

LEONT'YEV, L.I.; CHUFAROV, G.I.

Kinetics and the mechanism of calcium ferrite reduction. Zhur.neorg. khim. 9 no.1:25-28 Ja '64. (MIRA 17:2)

1. Institut metallurgii Ural'skogo filiala AN SSSR.

BRAYNINA, D.Z.; AVERBUKH, B.D.; ZHURAVLEVA, M.G.; CHUPAROV, G.I.

Equilibrium in the reduction of manganese-zinc ferrite by hydrogen.
Zhur.neorg.khim. 9 no.1:230-231 Ja '64. (MIRA 17:2)

1. Ural'skiy filial AN SSSR, Institut metallurgii.

L 22897-65 EED-2/EWT(l)/EWT(m)/EWP(b)/EWP(t) IJP(c) JD
ACCESSION NR: AP5001240 S/0126/64/018/005/0711/0716

AUTHOR: Bogoslovskiy, V.N.; Shchepetkin, A.A.; Startseva, I.Ye.; Antonov, V.K.; Chufarov, G.I.; Shur, Ya. S.

TITLE: Effect of the phase composition on the magnetic properties of magnesium-manganese-iron ferrite with a rectangular hysteresis loop

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 5, 1964, 711-716

TOPIC TAGS: ferrite magnetic property, magnesium ferrite, manganese ferrite, spinel solid solution, hysteresis loop

ABSTRACT: The object of this work was to find out whether the rectangularity of the hysteresis loop of Mg-Mn ferrites is related only to the presence of vacancies, or whether trivalent manganese ions also play a major part in this phenomenon. An Mg-Mn-Fe ferrite obtained from a mixture of 34 mol. % MgO, 8.5% MnO (in the form of $MnCO_3$) and 57.5% Fe_2O_3 and having a relatively high rectangularity coefficient of the hysteresis loop was investigated. X-ray diffraction was used to determine the concentration of the components of the spinel solid solutions, the magnetic characteristics were measured by the ballistic method, and changes in the composition of the solid solutions

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L 22897-65
ACCESSION NR: AP5001240

were induced by annealing the samples under various conditions. It was found that the increase or decrease in the rectangularity coefficient of the hysteresis loop is due primarily to the formation and disappearance of Mn^{3+} ions, although there is a simultaneous change in the concentration of vacancies in the spinel solid solution. Samples containing an appreciable quantity of vacancies but no Mn^{3+} ions have a rectangularity coefficient of less than 0.5. The authors conclude that the rectangular shape of the hysteresis loop of Mg-Mn-Fe ferrites obtained from a mixture containing over 50 mol. % Fe_2O_3 is due to the presence of Mn^{3+} ions which cause local distortions of the crystal structure of the spinel solid solution. Orig. art. has: 1 table, 1 figure, and 7 formulas.

ASSOCIATION: Institut metallurgii, Sverdlovsk (Metallurgical Institute); Institut fiziki metallov AN SSSR (Institute of the Physics of Metals, AN SSSR)

SUBMITTED: 02Nov63 ENCL: 00 SUB CODE: MM, EM

NO REF SOV: 007 OTHER: 010

Card 2/2

MEN', A.N.; STAFEYEVA, N.M.; BOGOSLOVSKIY, V.N.; ZHURAVLEVA, M.G.; CHUFAROV, G.I.

Determination of the concentration dependence of some thermodynamic functions of solid ferrite solutions. Dokl. AN SSSR 157 no.6:1441-1444 Ag '64. (MIRA 17:9)

1. Institut metallurgii, Sverdlovsk. 2. Chlen-korrespondent AN SSSR (for Chufarov).

CHUFAROVA, G.

Work and rest schedules in connection with the further shortening of the working hours. Biul. nauch. inform.: trud i zar. plata 4 no.9:10-16 '61. (MIRA 15:1)

(Ural Mountain region--Hours of labor)

CHUFAROV, V.I.

Portable crane. Put' i put. khoz. 8 no.10:31 '64.
(MIRA 17:12)

1. Starshiy dorozhnyy master, stantsiya Tomsk II, Zapadno-Sibirskoy dorogi.

KASIMOVSKIY, Ye.V.; BRAGINSKIY, B.I.; BUKHANEVICH, B.A.; MANEVICH, Ye.L.; SHKURKO, S.I.; KAPUSTIN, Ye.I.; MAYYER, V.F.; MIL'NER, G.V.; GOTLOBER, V.M.; CHUFAROVA, G.P.; RIMASHEVSKAYA, N.M.; MARKOV, V.I.; MIRKIN, V.D.; FILIPPOV, V.V., red.

[Problems of labor economics] Problemy ekonomiki truda. Moskva, Ekonomika, 1965. 309 p. (MIRA 18:8)

CHUFAROV

1. ARAKTARCV, V. I.; VARSHAVA, A. K.; ZHURAVLEVA, N. G.; CHUFAROV, I. G.

2. USSR (600)

4. Oxides

7. Reduction of mixtures of magnetic ferric oxide with nickelous oxide and cobaltous oxide. Dokl. AN SSSR 87, No. 1, 1952

9. Monthly List of Russian Accessions, Library of Congress, February 1953. Declassified.

KUZNETSOV, V.A.; CHUFAROVA, I.G.

Causes of the foaming of pickling solutions. Zhur.prikl.khim. 29 no.5:688-692 My '56. (MLRA 9:8)

1. Ural'skiy gosudarstvennyy universitet imeni A.M. Gor'kogo.
(Metals--Pickling)

SHAROVA, A.K.; CHUFAROVA, I.G.; VITTIKH, M.V.; SHOSTAK, F.T.

Recovery of germanium from dilute solutions by an ion exchange method. Izv. Sib. otd. AN SSSR no.8:36-42 '59. (MIRA 13:2)

1.Ural'skiy filial AN SSSR.
(Germanium--Analysis) (Ion exchange)

SHOSTAK, F.T.; VITTIKH, M.V.; SHAROVA, A.K.; CHUPAROVA, I.G.

Separation of germanium by an ion exchange method. Izv.Sib.otd. AN SSSR no.8:69-74 '60. (MIRA 13:9)

1. Nizhne-Tagil'skoye otdeleniye Nauchno-issledovatel'skogo instituta plasticheskikh mass i Ural'skiy filial AN SSSR.
(Germanium) (Ion exchange)

ACCESSION NR: AP5009948 UR/0078/65/010/004/0877/0882

AUTHOR: Chufarova, I. G.; Sharova, A. K.

TITLE: Niobium and tantalum arsenites

SOURCE: Zhurnal neorganicheskoy khimii, v. 10, no. 4, 1965, 877-882

TOPIC TAGS: niobium arsenite, tantalum arsenite, inorganic synthesis

ABSTRACT: In this work conditions were investigated for precipitation of niobium and tantalum from sulfuric acid solutions with sodium arsenite. Niobium pentoxide containing 99.9% Nb_2O_5 and tantalum metal (99.9% pure) were used for making sulfate [illegible] Niobium and tantalum arsenites were precipitated [illegible] addition of a [illegible] arsenite to the sulfate [illegible] basis of chemical analysis of the precipitated niobium and tantalum arsenites may be expressed by the formulas

$2Nb_2O_5 \cdot As_2O_3 \cdot 8H_2O$ and $2Ta_2O_5 \cdot As_2O_3 \cdot 8H_2O$.

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L 52974-65

ACCESSION NR: AP5009946

Heating curves display an endothermic effect at 145°C for niobium salt and at 180°C for tantalum salt and exothermic effects at 730°C and 945°C for niobium arsenite and tantalum arsenite respectively. The endothermic effect is due to the removal [illegible] while the ex thermal effect [illegible] of the [illegible] amorphous to the crystalline state [illegible] with [illegible] oxalic acid as well as oxalic acid [illegible] potassium [illegible]

SUB CODE: 008 OTHER: 004

MURASHOVA, V.I.; Prinimala uchastiye: CHUFAROVA, Z.G.

Determination of selenium in slimes containing platinoids.
Trudy Ural. politekh. inst. no.94:161-167 '60. (MIRA 15:6)
(Selenium)

ACC NR: AR6029472 SOURCE CODE: UR/0196/66/000/006/I010/I010

AUTHOR: Chufarovskiy, S. V.

TITLE: Simulated investigation of heat transfer in printed armature

SOURCE: Ref. zh. Elektronika i energetika, Abs. 6I63

REF SOURCE: Sb. dokl. k Nauchno-tekhn. konferentsii po elektr. mashinam s pachat. obmotkami. Novosibirsk, 1965, 33-40

TOPIC TAGS: ~~printed~~ armature, printed winding machine, heat transfer, heat transfer coefficient, electronic manufacturing machinery

ABSTRACT: To evaluate qualitatively the heat transfer of a disk armature carrying a printed winding, a physical model was prepared which simulated a DPO-2 d-c disk machine developed by the Novosibirsk Electrotechnical Institute. The model disk 200-mm diameter was made from glass-base textolite. Thirteen nickel rings 4-mm wide 0.2-mm thick were pasted onto each side of the disk. A 0.5-mm gap was left between the adjacent rings. All rings were connected in series. Special sliprings and brushes were used for connecting to the supply. The model was rotated by an auxiliary motor. Segments of the nickel rings with taps connected to measuring sliprings were used as temperature sensors. Use of nickel instead of copper increased the sensor sensitivity. The ring-type winding permitted neglecting the heat transfer along the disk radius. The heat transfer characteristics of the model were determined at 500--3000 rpm.

Card 1/2 UDC:621.3.017.001.57+621.3.045.21:621.3.049.75

ACC NR: AR6029472

From the experimental data, the disk-air temperature drop vs. disk radius was determined in graphical and criterial forms. A subsequent analysis showed that insofar as the local heat transfer was concerned, the disk armature can be subdivided into three different zones: the external end-parts zone, the active zone, and the internal end-parts zone. With laminar flow of the ambient air, the active-zone temperature was independent of the disk radius. With turbulent air-flow, the heat transfer of the disk armature everywhere depended on the disk radius. From the experimental data, average values of the heat transfer coefficient, for laminar air-flow conditions, were calculated. For the active zone, $\alpha = 0.177 \times 10^{-3} \sqrt{n}$; for the internal end-parts zone, $\alpha = 0.206 \times 10^{-3} \sqrt{n}$; for the external end-parts zone, $\alpha = 0.173 \times 10^{-3} \sqrt{n}$; where n - disk rpm; α - heat-transfer coefficient, w/cm^2.degreeC. Seven figures. N. Astakhov [Translation of abstract]

SUB CODE: 09

Card 2/2

ACC NR: AR6029471 SOURCE CODE: UR/0196/66/000/006/I010/I010

AUTHOR: Chufarovskiy, V. V.

TITLE: Calculation of the printed winding and magnetic system of a disk-armature motor

SOURCE: Ref. zh. Elektronika i energetika, Abs. 6I62

REF SOURCE: Sb. dokl. k Nauchno-tekhn. konferentsii po elektr. mashinam s pechatn. obmotkami. Novosibirsk, 1965, 22-32

TOPIC TAGS: disk motor, printed winding, electric motor, electronic manufacturing machinery

ABSTRACT: Formulas are derived which permit, from nominal data of the d-c machine, determining the size of its disk wave printed winding and of its symmetrical magnetic field system having pentagonal pole pieces. The winding end parts and pole-piece outlines have the shape of an involute. The emf formula is so transformed that it contains geometrical dimensions of the coil. The conductor cross-section is selected from the permissible temperature rise and with an allowance for printed-winding production technology. Six figures. Bibliography of 22 titles. N. Astakhov
[Translation of abstract]

SUB CODE: 09

Card 1/1 UDC: 621.313.2.043.049.75.001.24

GRIGOR'YEV, Yu.G.; ANDREYEVA, M.P.; KVASNIKOVA, L.N.; PIMENOVA, T.M.; CHUFIRINA, Z.K.

Effective use of roentgenography. Med.rad. 4 no.6:3-15 Je '59. (MIRA 12:8)
(ROENTGENOGRAPHY, review (Rus))

CHUFISTOV, A.I.

What did we gain from modernization? Bum.prom. 37 no.8:8-9 Ag '62.
(MIRA 17:2)

1. Nachal'nik bumazhnogo tsekha No.1 Kamskogo kombinata.

CHUFISTOV, N.Z.

Latch for KT-34 and KTV-35 contactors. Gaz. prom. 9 no.3:32-34 '64. (MIRA 17:9)

15(6) SOV/101-59-2-8/13

AUTHOR: Chufistov, Ye.

TITLE: Production of Cement From the Dust Deposited in the Electrofilters of the Rotary Kilns

PERIODICAL: Tsement, 1959, Nr 2, p 28 (USSR)

ABSTRACT: The author states that the velocity of the gases in large rotary kilns attains 15 m/s. Such flow of the gases takes off pulverized particles of the calcinated material, carrying them out of the kiln. The dust contains 40 - 50% of the calcinated material. Since 1958, by the suggestion of S. Sozanskiy, director of the Nikolayevskiy tsementnyy zavod (Nikolayev Cement Plant), such dust has been used for the production of "300" cement. The dust collected in filters is deposited every 12 to 14 days for the purpose of removing the free content of calcium oxide. Then, the dust having been mixed with the other components, such as clinker, gypsum and others, is ground and cement "200" and

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Production of Cement From the Dust Deposited in the Electrofilters of the Rotary Kilns

"300" are produced. In the first 10 months of 1958, the output of cement from the dust was 12,000 tons.

BUTUSOV, I.V., kand. tekhn. nauk; CHUFRYAKOV, L.F.

Numerical indicator with an electroluminescent sign dial. Avtom. i prib. no. 1:25-27 Ja-Mr '64. (MIRA 17:5)

CHUFY, JIRI

CZECHOSLOVAKIA/Farm Animals. Cattle. Q

Abs Jour: Ref Zhur-Biol., No 4, 1958, 16791.

Author : Chufý Jiří

Inst :

Title : On the Substances Contained in the Semen Which Contribute to the Fertilization of Farm Animals (K voprosu o veshchestvakh v sperme, sposobstvuyushchikh oplodotvoreniyu sel'skokhozyaystvennykh zhivotnykh)

Orig Pub: Veterinářstvi, 1957, 7, No 4, 115-116.

Abstract: If the semen of the bull is treated with methanol and the extract thus obtained is evaporated in boiling water bath and if the residue diluted by physiological solution is added to the fresh semen of the bull, then the prolongation of the

Card : 1/2

25

CZECHOSLOVAKIA/Farm Animals. Cattle. Q

Abs Jour: Ref Zhur-Biol., No 4, 1958, 16791.

motility of spermatozoa is observed. Methanol dissolves the substance which is called andro-hormone-1 by some authors.

Card : 2/2

S/051/60/009/005/019/019
E201/E191

AUTHOR: Chuganovskiy, V.M.

TITLE: Thirteenth Conference on Spectroscopy

PERIODICAL: Optika i spektroskopiya, 1960, Vol.9, No.5, pp 683-684

TEXT: This is an extension of the preceding note. Five sections of the Thirteenth Conference on Spectroscopy dealt with free molecules and condensed phases. Spectroscopy of solids was discussed in 35 papers. Several theoretical and experimental papers dealt with exciton absorption in crystals. Other workers dealt with spectra of crystals at low temperatures, in electric and magnetic fields, subjected to elastic deformation, pure crystals and crystals with impurities, dielectrics and semiconductors. There were papers on spectra of liquids and solids with hydrogen bonds, spectra of adsorbed molecules (several communications), electron spectra (60 papers), vibrational and vibration-rotation spectra (65 papers at 10 sectional sessions and several papers at plenary sessions), radiospectroscopy, paramagnetic electron resonance spectra, and nuclear resonance spectra (the last three subjects were dealt

S/051/60/009/005/019/019
E201/E191

Thirteenth Conference on Spectroscopy

with in 32 papers at 4 sectional sessions). The author is of the opinion that the Conference was overloaded with papers and participants. He suggests smaller and more frequent conferences on narrow subjects. These smaller conferences should be interspersed with more general conferences purely for discussion of problems presented in papers preprinted and circulated before such general conferences.

There are no figures, tables or references.

Card 2/2

VOZNESENSKIY, Arkadiy Dmitriyevich, polkovnik; CHUGASOV, A.A., podpolkovnik, red.; KUZ'MIN, I.F., tekhn.red.

[Individual means of antichemical protection; working principles and protective operation] Individual'nye sredstva protivokhimicheskoi zashchity; osnovy ustroistva i zashchitnogo deistviia. Moskva, Voen.izd-vo M-va obor.SSSR, 1960. 22 p. (MIRA 14:4)

(Chemical warfare--Safety measures)

TITOV, V.Ye., inzh.-podpolkovnik; CHUGASOV, A.A., podpolkovnik, red.; BUKOVSKAYA, N.A., tekhn.red.

[Methods and means for degasification, deactivation, and disinfection] Sposoby i sredstva degazatsii, dezaktivatsii i dezinfektsii. Moskva, Voen.izd-vo M-va obor.SSSR, 1960. 37 p. (MIRA 14:4)

(DECONTAMINATION (FROM GASES, CHEMICALS, ETC.))